Bush Terminal Company, Pier 7
(Bush Terminal, Pier 7)
Opposite the end of 41st Street
on Upper New York Bay
Brooklyn
Kings County
New York

HAER No. NY-201-A

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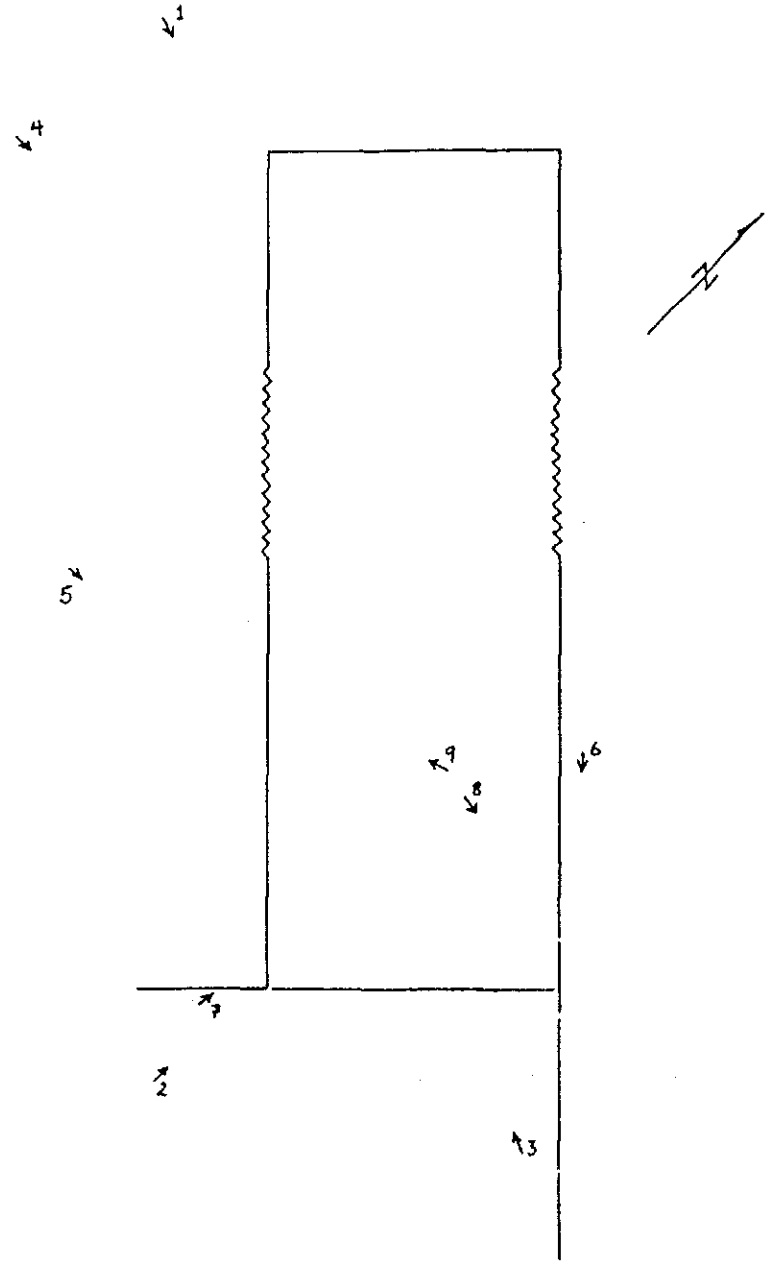
NY,
24-BROK,
54-A-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
Mid-Atlantic Region
National Park Service
U. S. Department of the Interior
Philadelphia, Pennsylvania 19106

KEY TO PHOTOGRAPHS



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HISTORIC AMERICAN ENGINEERING RECORD

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Location:	On Upper New York Bay, opposite the end of 41st Street Brooklyn, Kings County, New York UTM: 18.583100.4501000 Quad: Jersey City, New Jersey - New York
Dates of Construction:	c. 1880-85 - Part of substructure built 1905 - Existing pier and shed completed c. 1935-67 - Pier and shed modified
Engineer:	E. P. Goodrich, Chief Engineer Bush Terminal Company
Contractors:	Piershed fabrication and erection by American Bridge Company, Philadelphia, PA, through, respectively, subsidiaries New Jersey Steel and Iron Company (Trenton) and Post & McCord (Brooklyn).
Present Owner:	New York City Department of Ports and Trade Battery Maritime Building 1 Whitehall Street New York, NY 10004
Present Use:	Vacant; last used for cargo handling c. 1980
Significance:	Pier 7 was one of the two earliest piers at Bush Terminal, dating from the 1880s, and was the first to be completely rebuilt by Irving Bush with a piershed. It survives partly intact, and has the best preserved of the original terminal piersheds.
Project Information:	Bush Terminal is eligible for inclusion on the National Register of Historic Places. Pier 7 contributes to the significance of the terminal complex. As part of the New York Harbor Collection and Removal of Drift Project implemented by the Army Corps of Engineers, all pier components except the solid fill core will be removed. This documentation meets conditions for mitigating adverse effects to Pier 7 according to the terms of a Memorandum of Agreement among the Advisory Council on Historic Preservation, the New York State Preservation Officer, and the New York District, Corps

of Engineers. Further information on Bush Terminal appears in HAER No. NY-201. Project actions may occur as early as 1989.

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PART I: HISTORICAL INFORMATION

The Bush and Denzlow Manufacturing Company built about half of later Bush Terminal Pier 7 in the early 1880s, as part of its oil refining operations. Standard Oil Company, which purchased Bush and Denzlow prior to 1890, retained ownership of the pier until 1902, when it removed the refining facilities. Irving T. Bush immediately bought the pier, enlarged the pier substructure c. 1902-03, and had the existing piershed built in 1905. The piershed was the first built at the terminal, and one of the earliest in the Port of New York with a steel frame. Rapid shed erection by Post &McCord attracted professional attention. Sometime after completion of the shed, Bush Terminal Company leased Pier 7 to a series of shipping and stevedoring firms engaged in general cargo handling. Information on pier tenants is incomplete. Firms using Pier 7 included Phelps Brothers, operators for the Cosulich Line, in the 1920s; Lloyd Brasiliero in the 1930s and 1940s; and American Stevedors, Inc. in the 1950s and 1960s. Bush Terminal Company operated the pier itself in the 1970s, until c. 1978-80. Within a few yeArs of the cessation of operations, the pier began suffering a series of fires which destroyed most of the shed (Army Corps of Engineers 1926, 1932, 1942, 1953, 1965, 1978; Engineering Record 1905 [Appendix]; Bush 1928: 45].

Part II: DESCRIPTIVE INFORMATION

A. 1988 Conditions

A series of fire since 1981 has destroyed most of the Pier 7 shed, but the east end retains about three hundred feet of partly intact shed, with standing columns, trusses, roof sections, and offices.; The rest of the piershed is

essentially a twisted metsl sculpture. Considerable debris covers the inshore end of the pier, and the offices are in plsces badly deteriorated. Landwards access is blocked by impromptu barriers of well-placed abandoned cars. Despite these indignities, the east end of Pier 7 has the distinctive shed sides, cargo doors, and Bush Terminal colors which once highlighted the South Brooklyn waterfront [see HAER Photographs No. NY-201-A-1, NY-201-A-2, NY-201-A-3, and NY-201-A-4.

B. Original Constructions, c. 1880-1905

The Bush and Denzlow Manufacturing Company pier, forming the core of later Pier 7, is not well documented. Historic maps and later descriptions indicate it was about 150 feet wide, 930 feet long on the north side including part of slip approaching First Avenue, and 620 feet long on the south side where a timber bulkhead projected further outshore. The substructure consisted of a solid fill core retained by timber cribwork, and perhaps pile-supported timber decks along the outer edges. Ashes from the oil refining operations formed much of the fill material, probably with some stratified sand and gravel dredged from the shallow bottoms to allow for deepwater vessel access. Sand and gravel appear to form most of the fill added when the pier was enlarged c. 1902, although slag visible in upper fill deposits also suggests some use of industrial refuse, perhsps during 20th century pier maintenance. The height and foundation supports of the cribwork are unknown, but piles probsbly provided a firm base in the offshore sand. Although the Bush and Denzlow pier was apparently the same width as Pier 7, the original width of the solid fill core is also unclear. Fill appears under the deck in areas generally reported to have timber aprons, representing either a wider core than previously indicated, slumping of fill through deteriorated retaining structures, or additionsl fill and rip-rsp placed under the aprons during 20th century construction and maintenance. Above the substructure, the Bush and Denzlow firm erected a large number of undocumented brick and frame structures, removed by Standard in 1902 (Robinson 1886; Bromley 1893; Hyde 1898; Department of Docks and Ferries 1902; Army Corps of Engineers 1926, 1932, 1942, 1953; Bush 1928: 45; Drsvo Van Houten, Inc., 1984; HAER 1988).

The substructure completed by c. 1902 included an outshore extension of the 19th century pier, about 600 feet long, so that the Bush Terminal structure is about 152 feet wide, 1206 feet long on the north side, and 1, 220 long on the south side; as with the outer ends of all the terminal piers, this one was angled slightly to follow the federal pierhead line in New York Bay. The later section had a solid fill core sbout 95 feet wide, also primarily of sand and gravel. Unlike the timber cribwork of the earlier pier section, timber sheet piling retained the fill of the later one, typical of Bush Terminal pier construction; tie rods join the two sheet piling walls, with rip-rap providing additional support. After 1895, the older cribwork was at various times reinforced or replaced with sheeting of timber, concrete, and steel.

Pile-supported timber decks about 30 feet wide abutted the later section on the long sides of the pier, with similar structures of less certain width along the earlier section. Transverse pile rows under the decks occurred at about 15-foot intervals along the older section, and at 10-foot intervals along the later one. The fender system included timber, and later steel, sheeting. Details of the extreme outshore substructure beyond the piershed are unknown, but this section probably had denser pile arrays and thicker fender protection against vessel impacts. The pier deck pitched down between 2 and 3 degrees from the longitudinal center, and was finished at about 10 feet above mean low water. As of c. 1905, the deck generally consisted of 2.5-by-10-inch timber, laid at 45 degree angles on 6-by-6-inch timber supports, which in turn rested on solid fill or on pile-supported underdecks. The center of the deck appears to have been of small timber blocks. Two railroad tracks from the terminal eventually ran along the pier center, entering on the north half of the east or inshore pier end, but may not have been installed until c. 1932-42 (Figures 2 and 4; Army Corps of Engineers 1926, 1932, 1942, 1953; Dravo Van Houten, Inc., 1984) [see HAER Photograph No. NY-201-A-6].

The 1905 piershed was a one-story, steel-framed, wood-sided structure 143.3 feet wide and 1190 to 1197 feet long, depending on which documentary source one relies. Recent fires make precise measurement impossible. Four longitudinal rows of columns give the shed a three-bay width, with the center bay slightly more narrow at 45 feet wide. The peaked roof rises to about 30 feet above the pier deck. The two outer column rows are set about four feet from the extreme outer north and south pier edges, at 15-foot intervals, in transverse alignment with every third pair of outer columns. The larger interior columns are riveted, composite 8-by-10-inch I-beams, and rise vertically about 28 feet above 3-foot-square, 5-foot-high concrete pedestals, which in turn rest of four-pile clusters set in the pier fill. Similar pedestals support the outer columns, which are riveted, composite 6-by-10-inch I-beams rising to about 25 feet above the pier deck at angles of about 20 degrees. The lower 32 inches of each outer column are encased in concrete as fire prevention. Transverse roof trusses of paired, riveted steel angles connect each pair of outer columns and pass through the interior columns, supporting 4-by-12-inch timber purlins and a gabled, 3-inch timber roof most recently covered with composite tar-based material. Paired, riveted steel angles form two rows of longitudinal trusses which join the interior columns. The upper and lower chords of all trusses are at identical elevations, leaving 16.3 to 18.3 feet of headroom above the deck. Corrugated metal firewalls cover transverse trusses at every second set of interior columns, or every 90 feet, beginning about 180 feet from the east end of the shed (for further details, see Figures 2, 3, 4 and Engineering Record 1905 [Appendix]) [also see HAER Photographs No. NY-201-A-6 and NY-201-A-9].

The light olive-green paint which once marked the Bush Terminal waterfront covered the outside of the wood cargo doors and the 1-inch-thick, horizontal wood piershed siding. Except where occupied by offices or undocumented sheds,

virtually every opening between the sloped outer rows of piershed columns had a cargo door, hinged at the top and manually lifted from the interior bottom edges towards the roof. Surviving iron hooks in the timber purlins probably once supported block and tackle used for this task. Iron bolts on either side of a door bottom secured access from the inside simply sliding into the composite piershed columns. Two sizes of 15-foot-wide sloping doors survived in 1988: about 12 feet high, found in some northern bays, and about 23 feet high in all other bays. Most of the longer doors had been shortened at the bottoms (Army Corps of Engineers) [see HAER Photographs No. NY-201-A-2, NY-201-A-4, NY-201-A-5, NY-201-A-6, NY-201-A-7, NY-201-A-8, and NY-201-A-9].

The sloping doors, and some of the office doors and windows described below, comprised most of the original exterior piershed openings. There were pairs of skylights over each 15-foot transverse bay, staggered along the length of the pier relative to the roof peak [see HAER Photograph No. NY-201-A-1]. The end walls of the shed had no decoration, and undocumented arrays of doors. The outshore or west facade, now completely destroyed, probably had two 10-by-10-foot cargo doors. The surviving inshore facade had one 12-by-17-foot vehicular door, possibly in the central bay; larger roll-up doors installed in the 1960s removed much of the original central and northern bays. The south bay of this facade retains what was probably an original array of pedestrian doors and windows leading to office spaces, described below. One additional 6-by-3-foot pedestrian door also gave access through the east facade, in the northern bay (Figure 4; Army Corps of Engineers 1926, 1932, 1942, 1953, 1965) [see HAER Photograph No. NY-201-A-3].

In 1988, there were small groups of wood-framed offices in the inshore corners of the shed. The northern group, protruding through the side of the shed and angled along a former track alignment, probably represents a post-1905 addition. Some or all of the five rooms in the southern group, arrayed as shown in Figure 4, are probably original. All five rooms are 11.8 feet high, with plank or plywood floors and vertical sides. The two southernmost rooms thus have southern walls separate from the wood-clad shed sides, into which two office windows are framed out. The five rooms have exterior walls of gray-painted horizontal 1-by-6-inch boards. The northern three of the five rooms have interior and ceiling surfaces of green-painted 2.5-by-.5-inch, tongue-and-groove novelty siding; slightly larger siding covers the walls and ceiling of the southwesternmost room. The larger, southeasternmost room, once used as a timekeeper's office, is finished with gypsum board painted green above a gray wainscot. The five 4/4 sash office windows on the east shed facade are each 2.7 by 6 feet; the less intact windows through the south shed sides are 2-by-3 and 5-by-8 feet [see HAER Photographs No. NY-201-A-3 and NY-201-A-7].

When first completed, Pier 7 evidently had no sprinkler system, relying on municipal fire protection. A 4-inch main supplied water to the pier and, by way of hose connections, to the vessels alongside. Brooklyn Edison Company

supplied A.C. 120 volt, 3-phase, 60-cycle electric power, used for incandescent lights in the offices and suspended from piershed trusses (Army Corps of Engineers 1926, 1932, 1942, 1953, 1965).

C. Improvements Made Prior to World War II

Somewhat ambiguous Corps of Engineers data on Bush Terminal suggests that the tracks on Pier 7 were not installed until after 1932. Track installation may have been contemporary with construction of the northern group of offices, which closely paralleled the track alignment. As shown in Figure 4, this nearly-triangular office block has three larger rooms and two small toilets. Construction evidently involved removal of the original sloping shed wall, with the shed columns left in place inside the offices. As with the southern floors, with a light-and-dark green checked pattern, rest on 2-by-6-inch under-floor supported by pile caps. Green-painted, 1-by-4-inch tongue-and-groove siding cover the office exterior; interior walls consist of two-toned, green-painted gypsum board, with baseboatd and 2.8-foot-high wainscot. The ceilings are gypsum board painted light green. The offices are equipped with radiators and fluorescent lights. Most of the windows are 2.8 by 5.8 feet, with 4/4 sash; two larger windows facing the shed interior are 6.7 by 5.9 feet. The office doors are 2.8 by 7 feet.

D. Post-War Alternative

By 1947, Bush Terminal Company had installed sprinklers, standpipe hose connections, and manual firebox alarms on Pier 7, with the hose connections housed in wood sheds at approximately 70-foot intervals along the southern row of interior piershed columns. The limited available documentation for Pier 7 indicates that in 1948, the company may have installed trenches with removable timbers on all of its piers, for firefighting purposes; construction and location of these features remains undocumented. After c. 1950, the increasing importance of truck traffic in the port led to several major Pier 7 modifications, removal of the tracks inside the shed by c. 1953, paving the central shed bay with an 8-inch concrete slab at or about this time, and installation of two large steel roll-up doors in the east facade c. 1965-1970 (Army Corps of Engineers 1926, 1932, 1942, 1953, 1965; Department of Marine and Aviation 1947 [plans]; Department of Ports and Trade n.d.) [see HAER Photograph No. NY-201-A-3].

PART III. SOURCES OF INFORMATION

This section lists only documents directly relevant to Pier 7. For other sources on Bush Terminal, see HAER No. NY-201.

Plans and Drawings

No original drawings of Bush Terminal Pier 7 appear to survive at the New York City Department of Ports and Trade, which is the only known repository of such material. The only available drawing of Pier 5 (HAER No. NY-201-B) matches most of the structural details found at Pier 7:

American Bridge Company
1902 44th Street Pier - S. Brooklyn - N.Y./Water Front Improvements for the Bush Company, Ltd/Erection Diagram. Order No. A1343, Sheet No. 5. Drawing No. 1431. On file, Department of Ports and Trade, City of New York, Battery Maritime Building, 1 Whitehall Street, New York, NY 10004.

Later plans pertinent to Pier 7 include limited information on modifications:

Department of Marine and Aviation, city of New York
1947 Sprinkler Lines/Bush Terminal/Brooklyn, N.Y. Drawing 4734, dated October 2, 1947. Original source of drawing uncertain. On file, Department of Ports and Trade, City of New York, Battery Maritime Building, 1 Whitehall Street, New York, NY 10004.

Department of Ports and trade, City of New York
n.d. Permit files, c. 1928-present with indices, include plans of repairs or modifications planned by the Bush Terminal Company. The only permit of interest for this documentation is 2235A [currently missing] for possible 1948 installation of trenches for firefighting purposes. On file at department offices, Battery Maritime Building, 1 Whitehall Street, New York, NY 10004.

Historic Views

No historic views focused on Pier 7 have yet been located. For views of this pier in the context of the terminal, see HAER No. NY-201.

Bibliography

Unpublished Sources:

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Department of Docks and Ferries, City of New York
1902 Waterfront, City of New York. Atlas accompanying Annual Report, 1902-03. On file, Department of Ports and Trade, City of New York, Battery Maritime Building, 1 Whitehall Street, New York, NY 10004.

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Hyde, E. Belcher
1898 Atlas of the Brooklyn Borough of the City of New York. New York.

Robinson, E.
1886 Map of the City of Brooklyn. New York.

Figure 1. LOCATION OF PIER 7

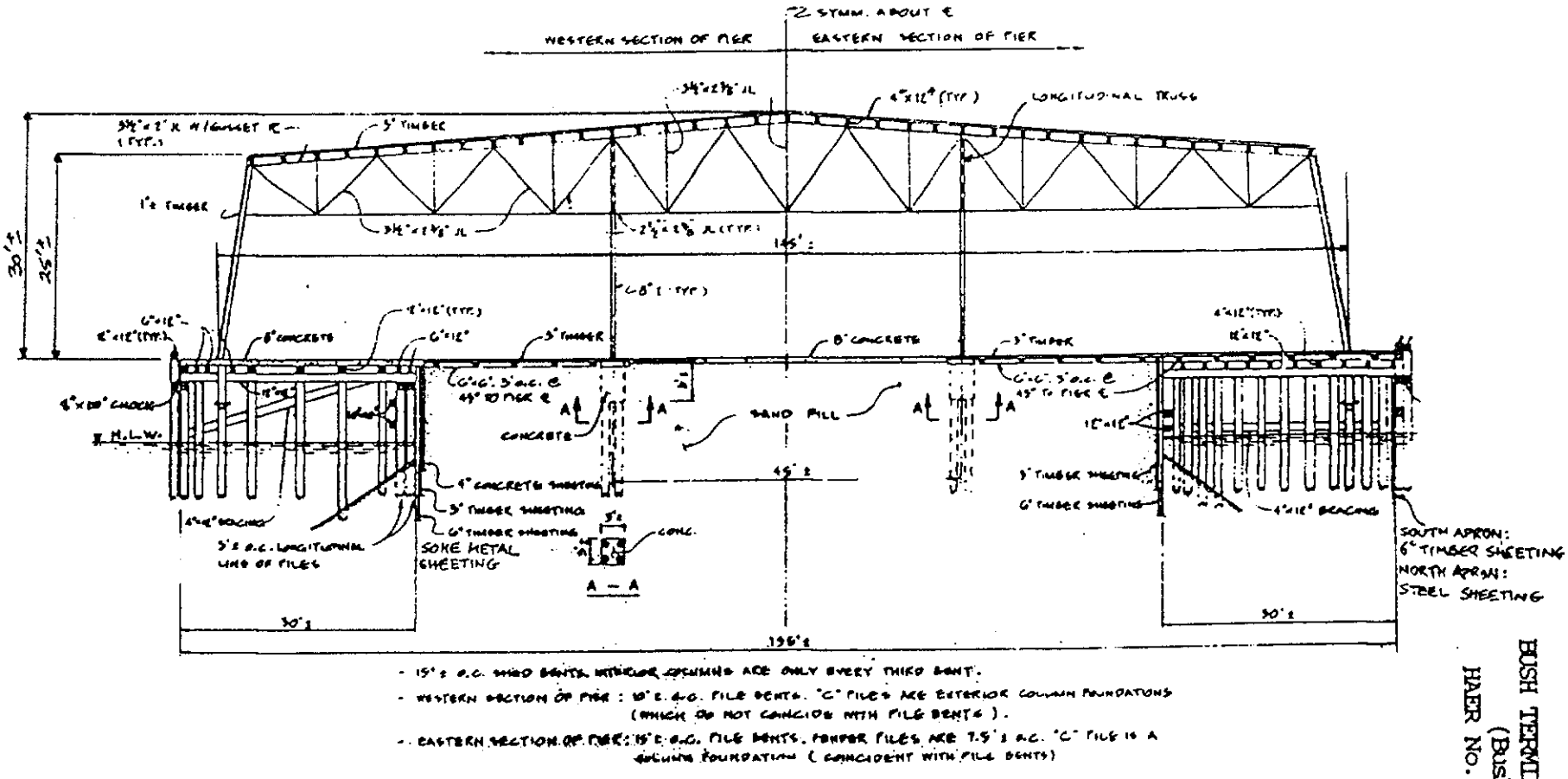
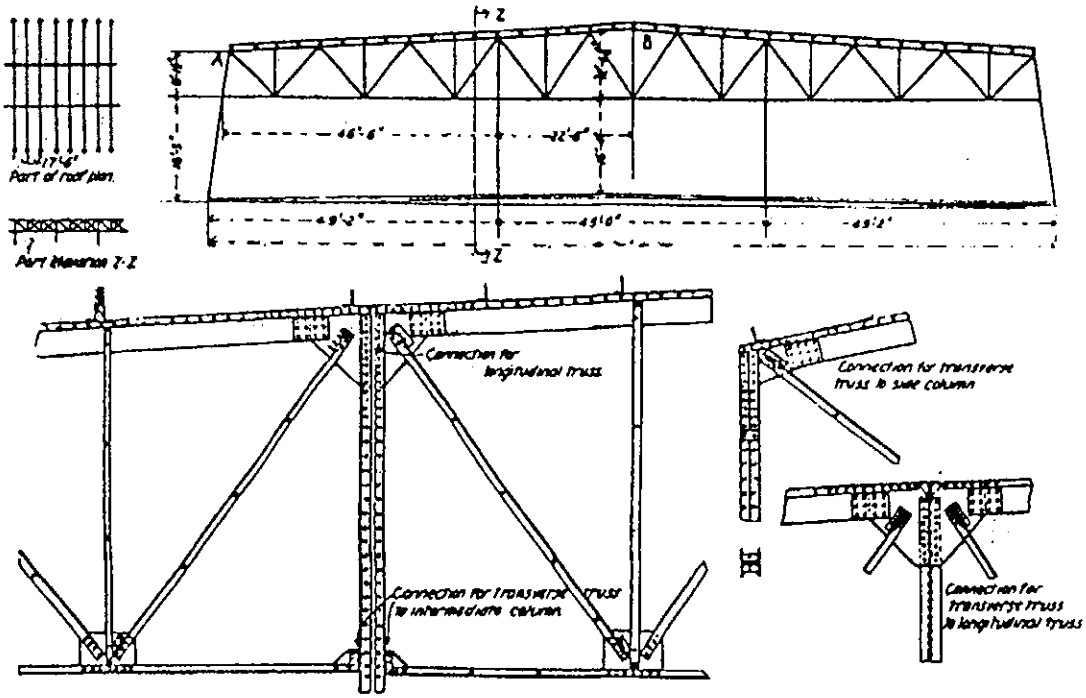


Figure 2. TYPICAL CROSS SECTION OF PIER 7
source: Dravo Van Houten 1984



Steel Shed of Pier Seven, South Brooklyn.

Figure 3. PIER 7 STRUCTURAL DETAILS
source: Engineering Record 1905

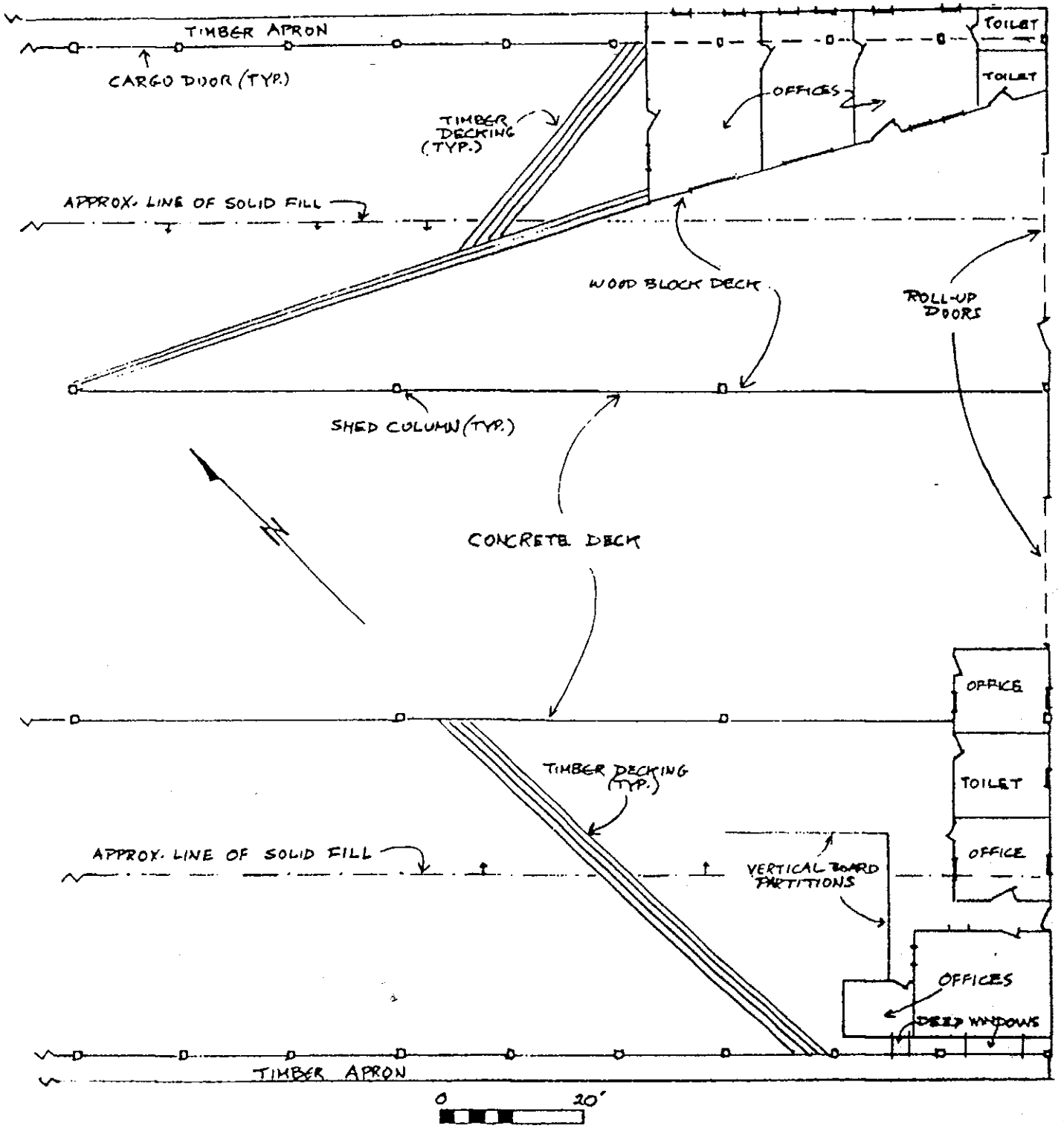


Figure 4. PLAN OF INSHORE END OF PIER 7, 1988

APPENDIX: DESCRIPTION OF PIER 7 FRAMING IN ENGINEERING RECORD 1905

VOL. 52, No. 18.

OCTOBER 28, 1905.

The Steel Shed of Pier 7, South Brooklyn.

Pier No. 7 on the South Brooklyn water-front in New York harbor is a one-story steel structure for the large terminal under construction by the Bush Co. It is 1,190 ft. long, 143 ft. 4 in. wide and about 30 ft. high. The construction is of interest from its simplicity and uniformity, which facilitated the erection with unusual rapidity. There are, as shown in the diagram, four longitudinal rows of columns, those on the outside being spaced 15 ft. apart and those in the two interior rows 45 ft. apart, so as to be in the transverse planes of every third pair of wall columns. The interior columns are connected by deep but light longitudinal trusses which, with the wall columns, support the transverse roof trusses 15 ft. apart. The top and bottom chords of the transverse and longitudinal trusses are in the same horizontal planes, and are connected with field-riveted gusset plates, so as to form a rigid system of longitudinal and transverse bracing, without the necessity for additional struts.

All the columns have H-shaped cross-sections made of two pairs of light 5 x 3-in. flange angles and a web plate, and all have base plates bolted to the timber deck of the pier. The outside columns are battered 2½:12 and at the upper end have the web plate cut shorter than the flange angles so that the latter form jaws field-riveted to the end connection plate which is shop-riveted in the transverse side roof truss. The center columns are made heavier than the side columns and the extended base plates are reinforced by vertical stiffening angles. At the upper end there is a short section of web plates much wider than the column which projects both sides to serve as a connection plate for the end top chords and diagonals of the transverse roof trusses, which are field-riveted to it. Most of the rivets through this plate and the flange angles are field driven and serve for the connection also of the column to the top chords of the longitudinal trusses.

The longitudinal trusses are 11 ft. 4 in. deep and have T-shape top and bottom chords made of pairs of 5 x 3 x ½-in. and 4 x 3 x 5/16-in. angles respectively. The web members are pairs of 5 x 3-in. angles back to back except the counters, which are single 2½ x 2½-in. angles. The connections are made by gusset plates riveted between the vertical flanges of the pairs of angles and having at the ends of the top and bottom chords short vertical angles for connection with the intermediate vertical columns. The outstanding flanges of the vertical members of the trusses have field-riveted connections for the transverse roof trusses which are connected to them with single vertical rows of rivets through the gusset plates at the ends of their top and bottom chords.

The transverse trusses for the side spans are 46½ ft. long, 8 ft. 1½ in. deep at the outer end and 10 ft. 11¾ in. deep over all at the inner ends. The T-shape top chord acts as a rafter for the purlins and has a deep web made with a 12 x 5/16-in. plate and two 3½ x 2½ x 5/16-in. angles. The remaining members of the truss are made with pairs of small angles, back to back with the connection plates riveted between vertical flanges.

The center span transverse roof trusses are 45 ft. long, 10 ft. 11¾ in. deep at the ends and 12 ft. 4¾ in. deep over all in the center and are made to correspond with the side trusses. All the trusses are riveted up complete at the bridge shops and were shipped on lighters to the pier site. The heaviest trusses weighed 3,000 lb. each and were quickly handled by the two booms of the light traveler which erected all the members of the structure, at a rate of as many as nine 15-ft. panels daily, the whole 600-ton structure being erected in two weeks. All field connections were bolted, no field rivets being driven.

The shed was designed and constructed under the direction of Mr. E. P. Goodrich, chief engineer of the Bush Co. Messrs. Post & McCord were the contractors.